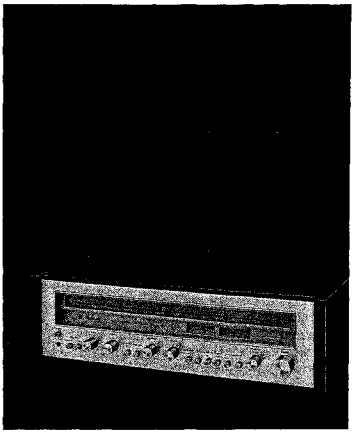
National Technics

FM/AM STEREO RECEIVER

SA-5570

OPERATING INSTRUCTIONS



Before operating this unit, please read these instructions completely.

Dear Stereo Fan

We want to thank you for selecting this product and to welcome you to the growing family of satisfied Technics product owners around the world. We feel certain you will get maximum enjoyment from this new addition to your home.
Please read these operating instructions carefully, and be sure to keep them handy for convenient reference.

MATSUSHITA ELECTRIC
Kadoma, Osaka, Japan

CONTENTS

HELPFUL HINTS 1
FOR AUSTRALIA 1
STAR FEATURES 2
CONNECTION WIRING FOR A STEREO SYSTEM ... 3
CONTROLS AND THEIR FUNCTIONS 4
CONNECTIONS AND OPERATION 6
VOLTAGE ADJUSTMENT 6
SPEAKER CONNECTIONS AND OPERATION ... 6
CONNECTION AND USE OF AN FM ANTENNA 7
CONNECTION AND USE OF AN AM ANTENNA 8
RECORD PLAYER CONNECTIONS AND OPERATION 9
CONNECTIONS TO THE AUXILIARY INPUT TERMINALS AND OPERATION 9
TAPE DECK CONNECTIONS, RECORDING AND PLAYBACK 9
CONNECTION AND USE OF HEADPHONES ...10
DECODER CONNECTION TERMINAL (4CH MPX OUT) 10
GROUND TERMINAL.....10
OPERATION CAUTIONS 11
TECHNICAL SPECIFICATIONS 12

HELPFUL HINTS

1. Keep this unit away from electrical noise-generating devices such as motors and fluorescent lamps.
2. The set should not be exposed to direct sunlight, and should be kept free from dust, moisture and vibration.
3. The set is ventilated through vents on the top and bottom of the cabinet. Do not place any object on the top, or place the set on a soft surface which might block the ventilation holes and result in too much internal heat. Place the receiver in a position away from any heat source.
4. The cabinet of your set should be given the same care which you would give any piece of fine furniture.
   The front panel should be cleaned with a soft cloth moistened with a mild soap-and-water solution.
   NEVER USE A SOLUTION CONTAINING BENZOL OR PETROLEUM.

FOR AUSTRALIA

FOR YOUR SAFETY

To ensure safe operation the three-pin plug supplied must be inserted only into a standard three-pin power point which is effectively earthed through the normal household wiring.
Extension cords used with the equipment must be three-core and be correctly wired to provide connection to earth. Wrongly wired extension cords are a major cause of fatalities.
The fact that the equipment operates satisfactorily does not imply that the power point is earthed and that the installation is completely safe. For your safety, if in any doubt about the effective earthing of the power point, consult a qualified electrician.

STAR FEATURES

AMPLIFIER SECTION

■ A highly-stabilized main amplifier section with a low distortion ratio

The basic circuitry of the main amplifier section of this unit is the differential-amplification, all-stage, direct-coupled OCL type of circuitry. "Dual-package" transistors are used in the differential-amplification stage of the first stage, and, in addition, a Zener diode is used for stabilization of the operation of the common emitter power source...thus resulting in a circuit design which has exceptionally high direct-current stability.
In addition, the output stage uses a combination of PNP and NPN transistors to form pure complementary circuitry, and the high-harmonic distortion ratio and the cross-modulated wave distortion ratio are very low, thus resulting in a superb high-frequency characteristic.
With regard to dynamic characteristics also, great care was taken to assure extremely faithful amplification, with a low distortion ratio, of even the most complex music signals.

■ Equalizer circuitry with high signal-to-noise ratio

The equalizer circuitry of this unit is the 3-stage, direct-coupled type, using low-noise, highly voltage-resistant integrated circuitry, in addition to low-impedance negative-feedback circuitry, thus resulting in a sensitivity of 2.5 mV and a high signal-to-noise ratio of better than 78 dB.
Moreover, in order to obtain an excellent RIAA reproduction characteristic, the negative-feedback element, which is so important in that respect, uses highly precise components which have a resistance deviation of 2.0% or less, thus resulting in a highly precise RIAA deviation of ±0.2 dB or less.

■ Tone control circuitry with low distortion ratio and smooth variation characteristics

The tone control circuitry of this unit uses the BAX-type, negative-feedback type of tone control, which is composed of 2-stage, direct-coupled circuitry in which low-noise transistors are used. The result is smooth variation characteristics, and exceptionally low undulation of the frequency response at the intermediate volume point.

FM TUNER SECTION

■ Highly sensitive, high-performance FM front-end

In addition to a dual-gate MOS FET in the RF-amplification stage, and high-frequency, low-noise transistors in the mixer stage—thus resulting in a highly stabilized RF stage with a high signal-to-noise ratio, the FM front-end is assured of high performance by the use of an oscillation coil in order to prevent local oscillation.
Furthermore, the adoption of a newly developed frequency-linear-type 3-gang variable capacitor makes tuning accuracy exceptionally high.
In addition, the use of delay AGC circuitry assures good reception, with a low distortion ratio, even under conditions of strong input power.

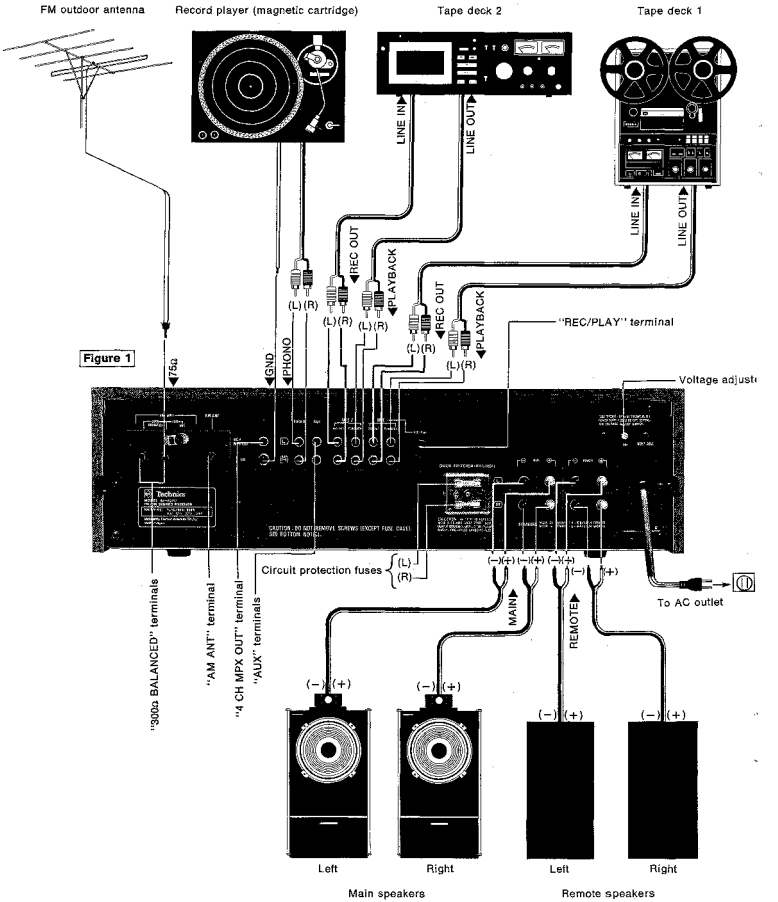
■ Strong emphasis placed on circuitry design for excellent group-delay characteristics in the FM IF section

In order to place importance upon the group-delay characteristics when designing the circuitry of the FM IF section, because they are so closely related to distortion and separation, three 2-element, group-delay, flat-type filters are used, and, in addition, in order to obtain excellent amplitude, the 7-stage IF-amplification system has six differential-amplification stages, resulting in selectivity of better than 70 dB and a signal-to-noise ratio of better than 75 dB...with a sharp increase in various characteristics during both stereo and monaural reproduction.
In addition, because the muting circuitry includes both wide and narrow AND circuitry, the "popping" noise heard when a broadcast is detuned has been eliminated.

■ MPX section with highly stable PLL

Use of the PLL system assures that the switching signal can to applied at higher stability and for longer periods. The switching circuitry consists of high-density integrated circuitry which is comprised of double differential switching circuitry, resulting is great improvement in the delay characteristics, the stereo distortion, the non-linear crosstalk, and the separation.

CONNECTION WIRING FOR A STEREO SYSTEM



CONTROLS AND THEIR FUNCTIONS

Power pushbutton (POWER)
Upon pushing this button, the tuning dial, the signal-strength meter and the FM center-tuning meter will illuminate, indicating that the receiver is on.
To turn the receiver off, push the button again; the lights of the tuning dial, signal-strength meter and the FM center-tuning meter will go off.

Speaker selection pushbuttons (SPEAKERS)
Pushbutton speaker selection system.
The speakers are selected by pushing one or both buttons, and are turned off by repushing. Only the speaker system which is switched on operates.
It is possible to operate both speaker systems by pushing both buttons.
In addition, sound reproduction can be enjoyed by using only the headphones, even when both speakers systems are switched off.

Tone controls (BASS, TREBLE)
These controls are used to make adjustments of the tone quality which may become necessary as a result of speaker characteristics or listening room characteristics, making it possible to adjust the tonal quality to that most agreeable to the listener's preference.
The bass control is for adjustment of the tone quality of the low sound range, and the treble control is for the high sound range. The characteristics can be changed within a range of +13 dB to −13 dB for the bass at 50 Hz, and within a range of +12 dB to −12 dB for the treble at 10 kHz. The characteristics are "flat" at the "0" position, and are increased by turning the control to the right from the "0" position, or decreased by turning it to the left.

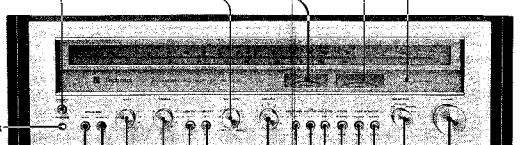
Low filter pushbutton (LOW FILT)
If this pushbutton is pressed to the "ON" position, bass sound which is lower than 100 Hz is decreased with a sharp curve characteristic of −6 dB/oct.
This pushbutton is especially useful when there is unwanted noise in the low range because of record warp, motor rumble, poor performance by the cone of the woofer, etc.

High filter pushbutton (HIGH FILT)
If this pushbutton is pressed to the "ON" position, treble sound which is higher than 7 kHz is decreased with a sharp curve characteristic of −6 dB/oct.
This pushbutton is especially useful if there is a great amount of record "scratch" noise, tape hiss, or if the tone quality is unsatisfactory because there is much distortion in the treble sound of the program source.

Volume control (VOLUME)
This control is for adjustment of the volume level.
Turning the control clockwise (maximum position is "10") increases the volume. Always set the volume control at "0" before turning on the unit.

Balance control (BALANCE)
The left and right volume balance is influenced by the difference, if any, between the efficiency of the left and right speakers, and by the placement of the furniture in the listening room.
In addition, the left and right volume of some program sources is not well balanced. If the control is turned further to the left, beyond the "0" position, the right sound becomes lower. At the "LEFT" position (at which the control is comply turned to the left), the right sound cannot be heard at all, and only the left sound is emitted.
If the control is turned to the right, the left sound becomes lower and, at the "RIGHT" position (at which it is completely pletely turned to the right), the left sound cannot be heard at all, and only the right sound is emitted.
In order to adjust the balance between the left and right volumes, push the mode pushbutton to the "MONO" position, so that the sound is heard from a position at the center between the left and right speakers.
After the balance is satisfactorily adjusted, push the mode pushbutton once again to release it outward to the "STEREO" position.

Figure 2



Loudness control pushbutton (LOUDNESS)
The loudness control compensates for "thinning out" of the sound. Human ears cannot perceive the low-frequency range at low volumes, but this control compensates for this, boosting the bass as the volume decreases. Note, however, that if the volume control is set to a position higher than the "5" indication, the efficiency becomes less.

FM muting-off pushbutton (FM MUTING)
This muting-off pushbutton should be kept in its normal position (released, muting-on position) to eliminate annoying between-station noise or extremely weak stations on the FM band. Because weak-signal stations are difficult to tune, nearly impossible to listen to in stereo, and will not possess the noise-free reception characteristics of strong-signal stations, it is recommended that you keep the muting-off pushbutton at the normal (released) position.
Should you wish to search for or listen to weak-signal stations, press the pushbutton (muting off).

FM center-tuning meter (TUNING)
For FM broadcasts, tune approximately by referring to the signal-strength meter. Pinpoint the best, least distorted position with the FM center-tuning meter.
The needle of the meter is in the center if no broadcast is being received. During tuning, the needle fluctuates to the left and right. When the station is locked in, the needle returns to the center. If the tuning control is re-adjusted, the needle will fluctuate again to the left and right, and when the broadcast is completely detuned, the needle returns to the center.

Signal-strength meter (SIGNAL)
Tune the receiver to the approximate frequency of the desired station.
Observing the signal-strength meter, tune until its indicator moves to the maximum position, which indicates the position of best tuning.

Stereo indicator (FM STEREO)
The stereo indicator illuminates in orange when the receiver is tuned to a station broadcasting in FM multiplex stereo.
If the mode pushbutton is pressed to the "MONO" position, the stereo indicator will not illuminate even though the broadcast is in stereo.

Mode pushbutton (MODE)
The mode pushbutton is used to select the playback mode of the program source.
This pushbutton has two positions, "STEREO" (released) and "MONO" (pressed).
STEREO For reproduction in stereo.
The left input is reproduced from the left speaker, and the right input is reproduced from the right speaker.
MONO Mixed inputs of both left and right are reproduced from both speakers as monaural sound.

MPX hi-blend pushbutton (FM HI-BLEND)
This pushbutton is effective only for FM stereo reception. This button, when pressed, blends an exact measure of the high frequency tones of the left and right audio channels to eliminate annoying background noise and hiss from very weak stereo stations.

Tuning control (TUNING)
Turn the tuning control slowly until the dial indicator indicates the desired FM or AM broadcast frequency. Always tune for the highest possible signal-strength meter reading, which indicates the optimum receiving position. This will assure clear, undistorted reception, minimum interference from adjacent stations, and maximum left-right channel separation during FM stereo broadcasts. The value of the signal-strength meter reading will depend on the signal-strength of that particular station.
When the FM center-tuning meter needle is at the center, reception is optimum. Turn the tuning control slowly to left and right until the FM center-tuning meter needle points to the center position.

Input selector (SELECTOR)
For selection of the input sound source.
PHONO For record player operation.
FM AUTO Use this position to listen to radio programs on the FM broadcast band. Many of the broadcasts on this band may be stereophonic.
The "FM AUTO" position automatically provides stereo/mono switching for stereo or monaural broadcasting.
AM Use this position to listen to radio programs on the AM broadcast band.
AUX For playback of the sounds from equipment connected to the auxiliary input terminals.

NOTE:
If the input levels of each program source are not matched and the input selector is inadvertently switched, a large sound output may be applied to the speakers, causing damage to them.
To avoid this, make sure, when switching inputs, either that the input levels are matched, or that the volume is reduced before switching.

Tape monitor pushbuttons (TAPE MONITOR)
When playing back from a tape deck, set the pushbutton to the "TAPE 1" (pressed) or "TAPE 2" (pressed) position. When playing back from the source designated by the input selector, set it to the "SOURCE" (released) position.
When using a 3-head tape deck, the sound which has just been recorded can be monitored by setting the pushbutton to the pressed ("TAPE 1" or "TAPE 2") position. The sound just prior to recording can be monitored by setting the pushbutton to the "SOURCE" (released) position.
In addition, the recording condition can be checked during recording by setting the pushbutton alternately to the "TAPE 1" ("TAPE 2")/"SOURCE" position.
TAPE-1 pushbutton: For monitoring tape deck 1 sound.
TAPE-2 pushbutton: For monitoring tape deck 2 sound.

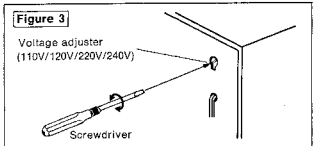
NOTE:
When monitoring with the tape-1 pushbutton, be sure to set the tape-2 pushbutton to the "SOURCE" position. When monitoring with the tape-2 pushbutton, be sure to set the tape-1 pushbutton to the "SOURCE" position.
Both sources, tape deck 1 ("TAPE 1") and tape deck 2 ("TAPE 2"), cannot be played back simultaneously, the unit being designed so that tape deck 2 will have priority.

Do not plug the receiver into a power outlet until all other connections have been made. Keep the power pushbutton to the "OFF" (released) position.

VOLTAGE ADJUSTMENT

Make sure that the voltage adjustment screw indicates the correct local voltage.
CAUTION: Be sure to set the voltage adjustment screw before connecting the AC power cord.

Figure 3



(For some areas, they do not include "voltage adjuster" for the safety standard and other reasons.)

SPEAKER CONNECTIONS AND OPERATION

This unit has two pairs of speaker terminals, marked "MAIN" and "REMOTE," making connection of two speaker systems possible. Selection of the speaker system to be used is made by pushing one, or both, of the speaker selection pushbuttons on the front panel, thereby activating either the main or remote speaker system, or both speaker systems at the same time.

■ Impedance of speakers

Use speakers with a voice coil impedance of 4~16Ω with this unit.
If, however, the main and the remote speaker systems are both used at the same time, speakers of 4-ohm impedance cannot be used. Use speakers with an impedance of 8~16Ω.

■ Speaker connection wire

Use medium gauge wire, such as AC power cord, for speaker connections so as not to decrease the damping factor.

■ Connections

For perfect connections, follow the procedure shown in figure 1 and figure 4. Note that the upper terminals are for the left channel, and the lower terminals are for the right channel; the brown terminals are ⊕ and the black terminals are ⊖.

Figure 4

1 ←¾→(20mm) Strip off about 3/4 inch (20mm) of the connection cord insulation and twist the strands together.	2 Turn the screw three or four times counterclockwise.
3 Form the strands of the core wire into a hook shape and connect to the terminal.	4 Tighten the screw snugly clockwise. The connection is then finished.

■ Speaker placement

In general, it is advisable to place the speakers on a hard wall surface. Soft surfaces can often ruin the deep tones of the bass.
Also avoid placing the speakers facing a solid surface because an echo effect may result and distort the quality of the reproduced sound.
In summary, place the speakers on a very hard surface, and, if a hard surface such as a window or panels faces the speakers, cover it with soft material such as curtains.

■ Polarity (⊕ and ⊖) check

After the connections of the speaker systems have been completed, confirm that the polarity of the speaker connections to the speaker terminals is correct.
How to check
Press the mode pushbutton to the "MONO" position. If the polarity is correct, the sound will seem to be heard from the center, between the left and right speakers.
If it is incorrect, the sounds will not appear to gather at the center, but will seem dispersed. If so, confirm that the connections of the speakers are correctly made. In order to correct the polarity, if it is incorrect, reverse the polarity connection between the amplifier and either the right or the left speaker.

NOTE:
Be extremely careful that the terminals or speaker wires do not "short" each other out. Never use the minus speaker terminal for ground connections.

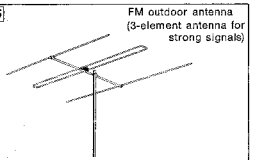
CONNECTION AND USE OF AN FM ANTENNA

To assure finest reception quality of FM broadcasts, it is necessary to use an antenna which is appropriate to the reception conditions in your area. Select the optimum antenna after referring to the information given below.

■ A place near the broadcasting station where signals are strong (within sight of the broadcasting station transmission antenna)

If this unit is used in a place which is near the broadcasting station and the signals are quite powerful enough, or in a place such as the outskirts of a city where interference noise is relatively slight, the feeder antenna which is included with this unit may be used to obtain a certain degree of reception, although, in order to obtain the best reception of which this unit is capable, it is recommended that a special outside antenna exclusively for reception of FM broadcasts, consisting of 3 to 5 elements, should be installed.

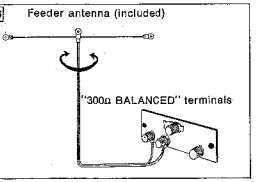
Figure 5



■ Feeder antenna

The feeder antenna which is included with this unit is provided so that you can use it to receive FM broadcasts temporarily until a special antenna exclusively for reception of FM broadcasts can be installed.
As shown in the illustration, connect this feeder antenna to the connection terminals of this unit marked "300Ω BALANCED" and, with both horizontal ends extended as shown, rotate the feeder antenna to the left and right and up and down while listening to an FM broadcast in order to determine the position of best reception. When this position has been determined, install the feeder antenna so that it remains in that position.

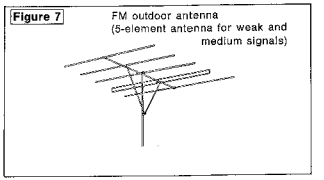
Figure 6



■ A place far from the broadcasting station where signals are weak and reception is difficult (such as near mountains or similar obstacles)

In such a location as described above, an FM antenna consisting of 5 elements or more should be installed. In general, the more elements which the antenna has, the better will be its directional characteristics. It is suggested, therefore, that the weaker the signal reception in your area, the more elements the antenna should have in order to obtain good reception.

Figure 7



■ Connection between the antenna and the receiver

The connection wire which is used between the antenna and the antenna input terminals of the receiver is usually a 300-ohm parallel feeder wire or a 75-ohm coaxial cable. In comparison to feeder wire, a coaxial cable is more resistant to external interference, and also prevents fluctuations of the signal level which might be caused by environmental weather conditions.
In order to obtain the finest performance from this unit, it is recommended that coaxial cable be used rather than feeder wire. Use coaxial cable of the type 5C-2V or 3C-2V.

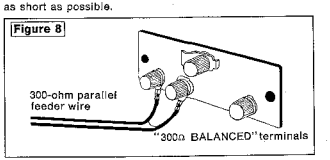
■ Connection to the FM antenna terminals of this unit

This unit includes two pairs of FM antenna input terminals: one pair of the 300-ohm type and one pair of the 75-ohm type. For this reason, connections can be made by using either a 300-ohm parallel feeder wire or a 75-ohm coaxial cable.

• If connections are made to the "300Ω BALANCED" terminals

Connections can be made, as shown in figure 8, by using 300-ohm parallel feeder wire. When this connection is made, the wire between this unit and the antenna should be as short as possible.

Figure 8



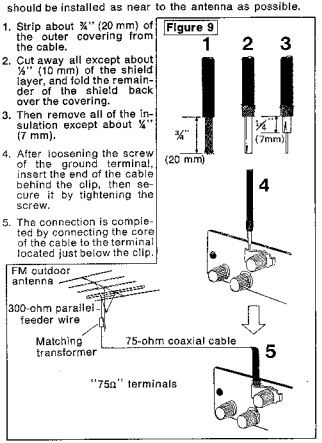
● If connections are made to the "75Ω" terminals

These connections should be made by using 75-ohm coaxial cable from the "75Ω" terminals of this unit, and by using a matching transformer between the antenna and this unit in order to match the impedance of the antenna to that of this unit.

A 300-ohm parallel feeder wire should be used to connect the matching transformer to the antenna, and the 75-ohm coaxial cable should be used to connect the matching transformer to the receiver. The matching transformer should be installed as near to the antenna as possible.

1. Strip about ¾" (20 mm) of the outer covering from the cable.
2. Cut away all except about ½" (10 mm) of the shield layer, and fold the remainder of the shield back over the covering.
3. Then remove all of the insulation except about ¼" (7 mm).
4. After loosening the screw of the ground terminal, insert the end of the cable behind the clip, then secure it by tightening the screw.
5. The connection is completed by connecting the core of the cable to the terminal located just below the clip.

Figure 9



Note, however, that most multi-element FM antennas which have 5 elements or more include a built-in matching transformer and, therefore, the 75-ohm coaxial cable can be connected directly to the antenna.

■ Installation of an antenna exclusively for FM broadcasts

The location of the exclusive antenna for FM broadcasts is a very important factor in the determination of tone quality, and even the best antenna will not perform satisfactorily if it is installed in a poor location.

Carefully consider, therefore, the following information before deciding upon the location of the antenna.

1. It should be located in a place which is in the direct path of the FM broadcast signals, and not where the signals will be obstructed by buildings or other obstacles.
2. In order to be free of ignition noise interference from automobiles, etc., it should be located as high above the ground as possible, and should be as far as possible from neon and other electric signs.
3. It should be installed 6 feet (2 m) or more from a metal roof, a concrete building, or from any other antennas, such as for television.
4. FM antennas have a high directional characteristic. In other words, they are much more sensitive to FM signals from one certain direction more than any other direction. The antenna should, therefore, be located so as to face in the direction of best reception.
5. It is usually true that the higher the antenna the better, although, depending upon the place, it may be that a lesser height would be more advantageous. Unless there are special conditions, therefore, a height of 12 feet (4 m) or more above the ground is suggested.

■ FM broadcast reception

1. Keeping the volume control at the "0" position, press the power pushbutton to the "ON" position.
2. Set the input selector to the "FM AUTO" position.
3. Release the tape monitor pushbuttons to the "SOURCE" position.
4. Release the mode pushbutton to the "STEREO" position.
5. Tune the receiver to the desired FM signal.
   After roughly locating the desired FM station with the signal-strength meter, pinpoint the position of least distortion with the FM center-tuning meter.
   The stereo indicator illuminates whenever the receiver is tuned to a stereo broadcast.
6. After pinpointing the desired station, increase the volume to the most comfortable listening level.
7. Make other adjustments in accordance with your taste and the acoustics of the room.

CONNECTION AND USE OF AN AM ANTENNA

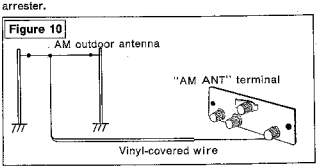
This unit includes a highly sensitive ferrite-bar antenna for reception of AM broadcasts and, therefore, there should be no necessity for connection of an outside antenna except in an area where signals are especially weak.

■ AM outdoor antenna

In weak signal areas, far from broadcasting stations, or in a reinforced-concrete building, the highly-sensitive built-in ferrite-bar antenna alone may fail to provide good AM reception. If so, connect a length of vinyl-covered wire to the AM antenna terminal (labeled "AM ANT," on the rear panel).

Then place this antenna outdoors a short distance away from the building. Because the sensitivity of an outdoor antenna varies greatly with its position, someone should listen for the strongest signals as the antenna is oriented. For safety reasons, the antenna should include a lightning arrester.

Figure 10



■ AM broadcast reception

1. Set the input selector to the "AM" position.
2. Release the tape monitor pushbuttons to the "SOURCE" position.
3. Set the mode pushbutton to either the "MONO" or "STEREO" position.
4. Tune the receiver to the desired AM signal.
   When the best tuning has been located, the needle of the signal-strength meter will be farthest to the right.
5. After tuning to the desired station, increase the volume to the most comfortable listening level.
6. Make other adjustments in accordance with your taste and the acoustics of the room.

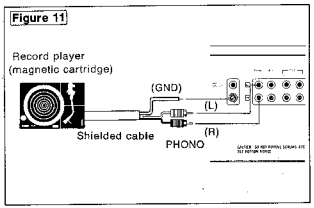
RECORD PLAYER CONNECTIONS AND OPERATION

■ Connections

Connect the record player to the "PHONO" terminals, being careful to connect the left and right connection wires correctly.

If the record player has a ground wire, connect it to the ground ("GND") terminal.

Figure 11



■ Cartridge

Use a magnetic cartridge [moving-magnet type (MM), induced-magnet type (IM), or high-output moving-coil type (MC)] with an output of 2mV~10mV (50mm/sec).
If a low-output moving-coil type is used, it cannot be connected directly to the phono terminals; a booster transformer or head-amplifier must be used.

■ Disc performance

1. Set the input selector to the "PHONO" position.
2. Release the tape monitor pushbuttons to the "SOURCE" position.
3. Release the mode pushbutton to the "STEREO" position.
4. Switch the turntable on and select the proper playing speed.
5. Place the tone arm on the record and increase the volume gradually to the most comfortable listening level.
6. Make other adjustments in accordance with your taste and the acoustics of the room.

CONNECTIONS TO THE AUXILIARY INPUT TERMINALS AND OPERATION

These terminals are for connection with the output terminals of a tape deck or 8-track stereo, a semiconductor cartridge with head amplifier, etc.

■ Reproduction

1. Set the input selector to the "AUX" position.
2. Release the tape monitor pushbuttons to the "SOURCE" position.
3. Release the mode pushbutton to the "STEREO" position.
4. Sound will be heard by operating the sound source and turning the volume control clockwise.

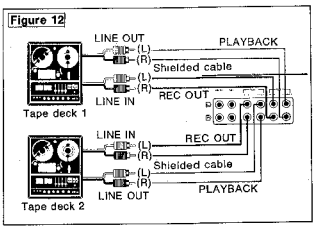
TAPE DECK CONNECTIONS, RECORDING AND PLAYBACK

You can connect 2 separate tape decks directly to this unit. The electronic characteristics of both tape deck terminals (1 and 2) are identical. Not only can this unit be used for recording to two tape decks at the same time, but tape "dubbing" (recording from one tape deck to another) is also possible.

■ Connections

Connect the playback terminals of this unit with the output terminals ("LINE OUT") of the tape deck.
Connect the recording output terminals of this unit with the input terminals ("LINE IN") of the tape deck.

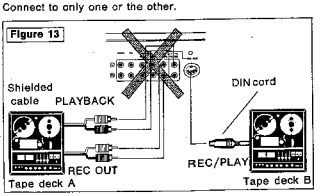
Figure 12



■ Recording/playback terminal

This is called the DIN connector,and is a terminal combining the functions of playback and recording. Recording and playback are possible by simply connecting one DIN cord.
Caution:
Do not connect a tape deck to the DIN terminal and to the pin-type terminals for tape deck 1 at the same time.
Connect to only one or the other.

Figure 13



■ Playback from a tape deck

1. Select the tape deck with the tape monitor pushbuttons.
   For playback from tape deck 1, press the tape–1 pushbutton to the "TAPE 1" position.
   For playback from tape deck 2, press the tape–2 pushbutton to the "TAPE 2" position.
   For playback from tape deck 1, release the tape–2 pushbutton to the "SOURCE" position.
2. Release the mode pushbutton to the "STEREO" position.
3. After preparing the tape deck for playback, increase the volume gradually to the most comfortable listening level.
4. Make other adjustments in accordance with your taste and the acoustics of the room.
   * This unit is designed for use with two tape decks, but it has a special circuit which allows tape deck 2 to take priority.
   In other words, only tape deck 2 is heard if the tape–1 and tape–2 pushbuttons are, respectively, in the TAPE 1 and TAPE 2 positions at the same time.

■ Recording with a tape deck

The signal selected by the input selector is emitted from the "REC OUT" terminals ("TAPE 1" and "TAPE 2") as the signal for recording.
In this instance, all operating controls, such as the volume control and the tone controls, have no effect upon the recording.

1. Set the input selector according to the program source which is to be recorded (FM AUTO, AM, PHONO, AUX).
2. Prepare the tape deck for recording.
   The program which has been selected with the input selector is then recorded onto the tape.
3. Be sure to adjust the recording level of the tape deck.
4. Recording check
   A. When using tape deck 1.
      Use the tape–1 pushbutton.
      If this pushbutton is released to the "SOURCE" position, the sound before recording can be heard from the speakers; if it is pressed to the "TAPE 1" position, the sound which has just been recorded is heard from the speakers.
      When using tape deck 1, be sure to release the tape–2 pushbutton to the "SOURCE" position.
   B. When using tape deck 2
      Use the tape–2 pushbutton.
      If this pushbutton is released to the "SOURCE" position, the sound before recording can be heard from the speakers; if it is pressed to the "TAPE 2" position, the sound which has just been recorded is heard from the speakers.
      When using tape deck 2, be sure to release the tape–1 pushbutton to the "SOURCE" position.
   C. To record to two tape decks at the same time.
      Note that, when recording to 2 tape decks at the same time, the recording made by tape deck 1 cannot be monitored during the recording.

■ To record from tape deck 1 to tape deck 2

1. Press the tape-1 pushbutton to the "TAPE 1" position.
2. Prepare tape deck 1 for playback and tape deck 2 for recording.
   It is now possible to record the program of tape deck 1 onto tape deck 2. In this case, all other controls will have no effect on the recording.
3. Check the recording condition by using the tape-2 pushbutton.
   If this pushbutton is released to the "SOURCE" position, the sound from tape deck 1 will be heard; if it is set to the "TAPE 2" position, the sound from tape deck 2 will be heard.

NOTE: This unit cannot be used for recording from tape deck 2 to tape deck 1.

CONNECTION AND USE OF HEADPHONES

Connection

Connect the headphones to the headphones jack at the left of the front panel. Use headphones with a voice-coil impedance of 4 to 16 ohms.

Operation

A signal is constantly supplied to the headphones jack regardless of the on/off setting of the speaker selection pushbuttons. When listening only by headphones, set the speaker selection pushbuttons to the OFF position.

DECODER CONNECTION TERMINAL (4 CH MPX OUT)

This is a signal output terminal for the discrete four-channel FM broadcasts which are expected in the future. To enjoy discrete four-channel FM broadcasts, one more pair of speakers, a pre-main amplifier and a decoder for discrete four-channel broadcasts are necessary, in addition to the ordinary stereo system.

GROUND TERMINAL

This terminal is connected with the ground wire of the record player, tuner and tape decks. When grounding, use vinyl-covered wire and add a copper strap to the end of the wire, which should either be buried or connected to a water pipe for efficient grounding.
Absolutely never attempt to connect this wire to a gas pipe.

OPERATION CAUTIONS

Connection wires

Wires used to connect this unit to other stereo equipment, such as a record player or a tape deck, should be high-quality shielded wire with low electrostatic capacity, and should, moreover, be thick wire and no longer than necessary. Use of this type of wire will minimize the incidence of induction of unwanted noise or hum, and will avoid loss of high-frequency characteristics. Especially note that, the longer the wire, the larger the decrease of high-frequency characteristics. Be sure that the wire is no longer than necessary for best results.

Connection caution

Be sure that the connections to the speakers and the input sources are securely made. If the connections are not secure, the receiver will not operate normally and may produce noise.

Cautions concerning operating and changing connections

After switching on the power, do not attempt to use the controls for a few moments. The output of this unit is large, and, if excessive input is applied, damage to the speakers may result.
For this reason, be sure to decrease the volume before making connections or disconnections of the input terminals.

Reproduction cautions

If unwanted noise such as hum or "howling" occurs while listening to a disc or tape, and the receiver is operating correctly, the noise may be caused by one or more of the following:

1. If the record player is placed directly on or near a speaker, the sound vibration from the speaker may be transmitted, causing "howling."
   Move the record player from the speakers or place a flat cushion under the record player, so that the vibration is not transmitted to the player.
2. Hum might be caused if the shield and center core of the connection wire are connected in reverse, or if the motor is not properly grounded.

Circuit protection fuses

If no sound is heard from one or more speakers when the unit has been installed correctly and the tuning dial is illuminated, turn off the power and check to see if a circuit protection fuse (on the rear panel) has failed.
If a circuit protection fuse has failed, replace it (fuse number XBA2C40SS0) after determining the cause of the fuse failure (such as a "shorted" speaker wire) and correcting it.
Do not use any fuse except the one included, or fuse number XBA2C40SS0.

TECHNICAL SPECIFICATIONS

AMPLIFIER SECTION

(IHF)

1 kHz continuous power output	
both channels driven	108W+108W (4Ω) 93W+93W (8Ω)
20 Hz~20 kHz continuous power output	
both channels driven	90W+90W (4Ω) 85W+85W (8Ω)
Power bandwidth	
both channels driven at 8Ω	10 Hz~40 kHz, −3 dB
Total harmonic distortion	
	0.1% at rated power (20 Hz~20 kHz) 0.05% at half power (1 kHz)
Intermodulation distortion	0.1%
Damping factor	55 (8Ω), 27.5 (4Ω)
Input sensitivity and impedance	
PHONO	2.5mV/47kΩ
AUX	150mV/35kΩ
TAPE 2 PLAYBACK	150mV/35kΩ
TAPE 1 PLAYBACK, REC/PLAY input	180mV/40kΩ
PHONO maximum input voltage (1 kHz, RMS)	150mV
S/N (IHF, A)	
PHONO	78 dB
AUX	95 dB
Frequency response	
PHONO	RIAA standard curve ±0.2 dB
AUX	20 Hz~20 kHz, ±0.5 dB
Tone controls	
BASS	50 Hz, +13 dB~−13 dB
TREBLE	10 kHz, +12 dB~−12 dB
Loudness control (volume at −30 dB)	50 Hz, +9 dB
Low filter	100 Hz, −6 dB/oct.
High filter	7 kHz, −6 dB/oct.
Output voltage	
TAPE 1 REC OUT	180mV
TAPE 2 REC OUT	150mV
TAPE 1 REC/PLAY output	30mV
Load impedance	
MAIN or REMOTE	4~16Ω
MAIN+REMOTE	8~16Ω

(DIN 45 500)

1 kHz continuous power output	
both channels driven	2×108W (4Ω) 2×93W (8Ω)
20 Hz~20 kHz continuous power output	
both channels driven	2×90W (4Ω) 2×85W (8Ω)
Power bandwidth	
both channels driven at 4Ω	10 Hz~40 kHz, −3 dB
Total harmonic distortion	
rated power at 40 Hz~16000 Hz, 4Ω	0.1%
Intermodulation distortion	
rated power at 250 Hz: 8000 Hz, = 4:1, 4Ω	0.1%
Frequency response	20 Hz~20 kHz, ±0.5 dB
S/N	
rated power PHONO	65 dB
AUX	80 dB
50mW power output PHONO	50 dB
AUX	50 dB

FM TUNER SECTION

(IHF)

Frequency range	88~108 MHz
Antenna terminals	300Ω (balanced) 75Ω (unbalanced)
Sensitivity	1.8μV
Total harmonic distortion	
MONO	0.15%
STEREO	0.25%
S/N	
MONO	75 dB
STEREO	72 dB
Frequency response	20 Hz~15 kHz, $^{+0.2}_{-0.8}$ dB
Selectivity	70 dB
Capture ratio	1.5 dB
Image rejection at 98 MHz	53 dB
IF rejection at 98 MHz	80 dB
Spurious response rejection at 98 MHz	78 dB
AM suppression	55 dB
Stereo separation	
1 kHz	45 dB
10 kHz	35 dB
Leak carrier 19 kHz	−65 dB
38 kHz	−75 dB

(DIN 45 500)

Sensitivity	1.8μV, S/N 30 dB, 300Ω 1.5μV, S/N 20 dB, 300Ω 1.3μV, S/N 30 dB, 75Ω 0.9μV, S/N 20 dB, 75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.25%
S/N	
MONO	56 dB
STEREO	54 dB
Leak carrier	
19 kHz	−65 dB
38 kHz	−75 dB
Limiting point	1.0μV
Bandwidth	
IF amplifier	250 kHz
FM demodulator	1000 kHz

AM TUNER SECTION

Frequency range	525~1605 kHz
Sensitivity	30μV, 260μV/m
Selectivity	22 dB
Image rejection at 1000 kHz	47 dB
IF rejection at 1000 kHz	40 dB

GENERAL

Power consumption	650W
Power supply (50 Hz/60 Hz)	110V/120V/220V/240V AC 240V only (For Australia)
Dimensions (W×H×D)	541×155×420 mm 21⅜"×6⅛"×16½"
Weight	17.7 kg. (38.9 lb.)